I claim

1. A synthetic hydrotalcite of the general formula:

$$[M^{2+}_{1-x}M^{3+}_{x}(OH)_{2}]^{x+}\,[A^{n-}_{x/n}\cdot mH_2O]^{x-}$$

wherein M^{2+} is a divalent cation, M^{3+} is a trivalent cation and A^{n-} is at least one organic anion comprising a carboxylate of an acid containing at least one heteroatom selected from the group consisting of nitrogen, phosphorous, sulfur and halogens.

2. The synthetic hydrotalcite of claim 1, wherein said divalent cation source, M^{2+} consists essentially of Mg^{2+}.

3. The synthetic hydrotalcite of claim 1, wherein said trivalent cation source, M^{3+} consists essentially of Al^{3+}.

4. The synthetic hydrotalcite of claim 1, wherein said at least one organic anion, A^{n-} comprises an amino acid.

5. The synthetic hydrotalcite of claim 4, wherein said amino acid comprises 4-aminobutyric acid.

6. The synthetic hydrotalcite of claim 4 wherein said amino acid comprises 6-aminocaproic acid.

7. The synthetic hydrotalcite of claim 1, wherein said hydrotalcite is capable of self exfoliation.

8. The synthetic hydrotalcite of claim 7, wherein said hydrotalcite is capable of reversible exfoliation.

9. The synthetic hydrotalcite of claim 1, wherein said hydrotalcite is capable of reversible exfoliation.

10. The synthetic hydrotalcite of claim 1, wherein said divalent cation, M^{2+} comprises Mg^{2+} and up to 50% of at least one divalent cation selected from Ni^{2+}, Co^{2+}, Zn^{2+}, Cu^{2+} and Mn^{2+}.

11. The synthetic hydrotalcite of claim 1, wherein said trivalent cation, M^{3+} comprises Al^{3+} and up to 50% of at least one trivalent cation selected from Al^{3+}, Cr^{3+}, and Fe^{3+}.

12. A method of making a synthetic hydrotalcite having the general formula

$$[M^{2+}_{1-x}M^{3+}_{x}(OH)_2]^{x+}[A^{n-}_{x/n}\cdot mH_2O]^{x-}$$

wherein M^{2+} is a divalent cation, M^{3+} is a trivalent cation and A^{n-} is at least one organic anion comprising a carboxylate of an acid containing at least one heteroatom selected from the group consisting of nitrogen, phosphorous, sulfur and halogens, said method comprising:

reacting said trivalent cation source, M^{3+} with said organic anion source, A^{n-} to produce an intermediate; and

reacting said intermediate with said divalent cation source, M^{2+} in water to produce said synthetic hydrotalcite.

13. The method of claim 12, wherein said step of reacting said trivalent cation source, M^{3+} with said organic anion source, A^{n-} occurs in water.

14. The method of claim 13, wherein the reaction time of said step of reacting said trivalent cation source, M^{3+} with said organic anion source, A^{n-} is from about 4 to about 8 hours at a temperature of about 75°-85°C.

15. The method of claim 12, wherein the reaction time of said step of reacting said divalent cation source, M^{2+} with said intermediate is from about 4 to about 8 hours at a temperature of about 90°C.

16. The method of claim 12, wherein said step of reacting said trivalent cation source, M^{3+} with said organic anion source, A^{n-} occurs in an organic solvent.

17. The method of claim 12, wherein said step of reacting said trivalent cation source, M^{3+} with said organic anion source, A^{n-} occurs in an acid melt.

18. The method of claim 12, wherein said trivalent cation source, M^{3+} consists essentially of Al^{3+}.

19. The method of claim 12, wherein said trivalent cation source, M^{3+} contains $A1^{3+}$ and up to 50% of at least one of Cr^{3+} and Fe^{3+}.

20. The method of claim 12, wherein said divalent cation source, M^{2+} consists essentially of Mg^{2+}.

21. The method of claim 12, wherein said divalent cation source, M^{2+} contains Mg^{2+} and up to 50% of at least one of Ni^{2+}, Co^{2+}, Zn^{2+}, Cu^{2+} and Mn^{2+}.

22. The method of claim 12, wherein said at least one organic anion source, A^{n-} comprises an amino acid.

23. The method of claim 22, wherein said amino acid comprises 4-aminobutyric acid.

24. The method of claim 22, wherein said amino acid comprises 6-aminocaproic acid.

25. The method of claim 12, further comprising isolating said synthetic hydrotalcite as a solid and drying said synthetic hydrotalcite.

26. The method of claim 25, wherein said drying is accomplished in a spray drier.

27. The method of claim 12, wherein said synthetic hydrotalcite is capable of self exfoliation.

28. The method of claim 27, further comprising isolating said synthetic hydrotalcite as a colloidal suspension in a solvent.

29. The method of claim 28, wherein said solvent is water.

30. The method of claim 28 wherein said solvent is an alcohol.

31. The method of claim 28, further comprising evaporating a portion of said solvent to produce a concentrated colloidal suspension of said synthetic hydrotalcite.

32. The method of claim 28, further comprising evaporating a portion of said solvent to produce a paste of said synthetic hydrotalcite.

33. A synthetic hydrotalcite-poly-addition polymer blend comprising:

at least one poly-addition polymer; and

a synthetic hydrotalcite of the general formula:

$$[M^{2+}{}_{1-x}M^{3+}{}_{x}(OH)_{2}]^{x+}\,[A^{n-}{}_{x/n}\cdot mH_{2}O]^{x-}$$

wherein M^{2+} is a divalent cation, M^{3+} is a trivalent cation and A^{n-} is at least one organic anion comprising a carboxylate of an acid containing at least one heteroatom selected from the group consisting of nitrogen, phosphorous, sulfur and halogens.

34. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said divalent cation, M^{2+} consists essentially of Mg^{2+}.

35. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said trivalent cation, M^{3+} consists essentially of $A1^{3+}$.

36. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said at least one poly-addition polymer is selected from the group consisting of polypropylene, polyethylene, polybutene-1, poly-4-methyl pentene-1, polyvinyl chloride and polystyrene.

37. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said at least one poly-addition polymer comprises a maleated polyolefin.

38. The synthetic hydrotalcite-poly-addition polymer blend of claim 37, wherein said maleated polyolefin comprises maleated polypropylene.

39. The synthetic hydrotalcite-poly-addition polymer blend of claim 33 wherein said organic anion, A^{n-} comprises an amino acid.

40. The synthetic hydrotalcite-poly-addition polymer blend of claim 39, wherein said amino acid comprises 4-aminobtyric acid.

41. The synthetic hydrotalcite-poly-addition polymer blend of claim 39, wherein said amino acid comprises 6-aminocaproic acid.

42. The synthetic hydrotalcite-poly-addition polymer blend of claim 39, wherein said at least one polymer comprises a maleated polyolefin.

43. The synthetic hydrotalcite-poly-addition polymer blend of claim 42, wherein said maleated polyolefin bonds with said amino acid in the form of an amide.

44. The synthetic hydrotalcite-poly-addition polymer blend of claim 42, wherein said maleated polyolefin bonds with said amino acid in the form of an imide.

45. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said hydrotalcite is capable of self exfoliation.

46. The synthetic hydrotalcite-poly-addition polymer blend of claim 45, wherein said hydrotalcite is capable of reversible exfoliation.

47. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said hydrotalcite is capable of reversible exfoliation.

48. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said divalent cation, M^{2+} contains Mg^{2+} and up to 50% of at least one divalent cation selected from Ni^{2+}, Co^{2+}, Zn^{2+}, Cu^{2+} and Mn^{2+}.

49. The synthetic hydrotalcite-poly-addition polymer blend of claim 33, wherein said trivalent cation, M^{3+} contains Al^{3+} and up to 50% of at least one trivalent cation selected from Cr^{3+} and Fe^{3+}.

50. A method of making a synthetic hydrotalcite-poly-addition polymer blend, said method comprising:

mixing an emulsion comprising at least one poly-addition polymer with a hydrotalcite of the following formula to obtain a blend,

$$[M^{2+}{}_{1-x}M^{3+}{}_{x}(OH)_2]^{x+}\,[A^{n-}{}_{x/n}\cdot mH_2O]^{x-}$$

wherein M^{2+} is a divalent cation, M^{3+} is a trivalent cation and A^{n-} is at least one organic anion comprising a carboxylate of an acid containing at least one heteroatom selected from the group consisting of nitrogen, phosphorous, sulfur and halogens.

51. The method of claim 50, wherein said at least one poly-addition polymer is selected from the group consisting of polypropylene, polyethylene, polybutene-1, poly-4-methyl pentene-1, polyvinyl chloride and polystyrene.

52. The method of claim 50, wherein said at least one poly-addition polymer comprises a maleated polyolefin.

53. The method of claim 52, wherein said maleated polyolefin comprises maleated polypropylene

54. The method of claim 50, further including a step of drying said blend.

55. The method of claim 54, wherein said step of drying comprises spray-drying.

56. The method of claim 50 wherein said organic anion, A^{n-} comprises an amino acid.

57. The method of claim 56, wherein said amino acid comprises 4-aminobtyric acid.

58. The method of claim 56, wherein said amino acid comprises 6-aminocaproic acid.

59. The method of claim 56, wherein said at least one poly-addition polymer comprises a maleated polyolefin.

60. The method of claim 59, wherein said maleated polyolefin reacts with said amino acid to form an amide.

61. The method of claim 59, wherein said maleated polyolefin reacts with said amino acid to form an imide.

62. The method of claim 50, wherein said hydrotalcite is capable of self exfoliation.

63. The method of claim 62, wherein said hydrotalcite is capable of reversible exfoliation.

64. The method of claim 50, wherein said hydrotalcite is capable of reversible exfoliation.

65. A synthetic hydrotalcite-poly-addition polymer blend comprising:

a maleated polyolefin, at least one unmodified poly-addition polymer; and

a synthetic hydrotalcite of the general formula:

$$[M^{2+}_{1-x}M^{3+}_{x}(OH)_2]^{x+}[A^{n-}_{x/n}\cdot mH_2O]^{x-}$$

wherein M^{2+} is a divalent cation, M^{3+} is a trivalent cation and A^{n-} is at least one organic anion comprising a carboxylate of an amino acid.

66. The synthetic hydrotalcite-poly-addition polymer blend of claim 65, wherein said amino acid comprises 4-aminobtyric acid.

67. The synthetic hydrotalcite-poly-addition polymer blend of claim 65, wherein said amino acid comprises 6-aminocaproic acid.

68. The synthetic hydrotalcite-poly-addition polymer blend of claim 65, wherein said maleated polyolefin bonds with said amino acid in the form of an amide.

69. The synthetic hydrotalcite-poly-addition polymer blend of claim 65, wherein said maleated polyolefin bonds with said amino acid in the form of an imide.

70. The synthetic hydrotalcite-poly-addition polymer blend of claim 65, wherein said at least one unmodified polymer is selected from the group consisting of polypropylene, polyethylene, polybutene-1, poly-4-methyl pentene-1, polyvinyl chloride and polystyrene.